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CHALLENGES OF SPACE POWER AND ANCILLARY SERVICES BEAMING: KEY TO OPENING THE CISLUNAR MARKETPLACE

Abstract

This paper will address the challenges of space power and ancillary services beaming in the context of opening the Cislunar marketplace.

More specifically, it will provide updated status on the Technology Development, Demonstration, and Deployment (TD**3) mission development efforts for: • ISS Space-to-Space Power ancillary services Beaming (SSPB) • Surface-to-Surface Power ancillary services Beaming (SSPasB) for lunar applications • Space-to-Alternate Surfaces Moon/Asteroids • Space-to-Earth as well as the opportunity to upgrade ISS to better serve as a TD**3 platform.

The technology to enable providing wireless utility services (e.g., power, data, communications, navigation, time, heat, etc.) to multiple Clients/Customers (C/C) across Cislunar space (Karman line to the far side of the Moon) in a cost and resource effective manner is now moving forward.

The availability of power and ancillary services (e.g., communications, data, navigation, time, etc.) is essential to most if not all aspects of lunar operations. The unbundling of space electrical power systems (i.e., separation of power generation, transmission, distribution, control, and loads) affords opportunities for redistribution of mass, overall volume, surface area, and complexity which can be mission enhancing/enabling. Increasing the availability of power and data transfer performance while simultaneously reducing the resource burden (mass, power, volume) to achieve the same that must be borne by the C/Cs will be mission enhancing if not mission enabling.

The narrative of the Cislunar Marketplace as a cooperative, collaborative, and competitive ecosystem of entities engaged in space development speaks to how we can achieve the "promise of the future". This is directly relevant to the IAC Congress Theme of "Space: The Power of the Past, the Promise of the Future".

Going forward space development will accomplished by a combination of entities including: nation state sponsored space agencies, commercial firms, non-profit organizations, universities, inspired billionaires, and individuals that bring unique talents/resources to the table.

The realization of space solar power systems across the Cislunar marketplace will be both mission enhancing and enabling.

This multidisciplinary paper will focus on engaging the IAF technical audience in a collaborative discussion of the Challenges of Space Power and Ancillary Services Beaming as a Key to Opening the Cislunar Marketplace and the potential solution space for fostering space development.

It is envisioned that these workshops could become an integral part of the ongoing work of the IAF and its constituent members, serving as multi-sector "industry" fora.